CM6
PowerPC® MPC 8641D 3U CompactPCI™ Embedded Computer

Features
- Freescale™ PowerPC® MPC8641 in single or dual core with Altivec™
- Freescale 8640/8640D ready
- Up to 1333 MHz
- Integrated 64 Kbyte L1 and 1 Mbyte L2 cache per core
- Ultra compact, one slot
- System and non-system functionality
- Up to 1 Gbyte DDR2 SDRAM with ECC
- Up to 256 Mbyte Flash
- 128 Kbyte nvSRAM
- 32-bit/66 MHz CPCI backplane
- Two Gigabit Ethernet ports on rear
- One PMC extension Slot (64-bit/100 MHz)
- Two UART serial controller
  - 1x RS-232
  - 1x RS-422/485
- Four 32-bit timer/counter
- Eight General Purpose I/Os
- RTC, watchdog, temperature sensors
- Optional -40 °C to +85 °C
- Optional conduction cooled
- High shock and vibration immunity with stiffener bars and wedge locks
- Conformal coating on request
- Customer specific, low cost assembly versions
- RoHS compliant

The CM6 is a 3U CompactPCI CPU board with integrated dual core or single core Freescale MPC8641 processor. The MPC8641D follows the system on a chip approach by integrating the memory controller, Ethernet channels, PCI Express as well as UARTs and timers.

The processor includes one or two execution cores in a single processor case, each core with its own L1 and L2 cache including Altivec support. This enables execution of parallel threads or applications on separate cores with dedicated CPU resources.

CM6 is designed to meet the requirements of markets such as telecom, simulation/training, test and measurement, military and aerospace.

Based on the Freescale MPC8641D, the platform is designed to support processor speed up to 1.33 GHz. Rugged needs are addressed with an optional extended temperature range of −40 °C to +85 °C and conformation coating. Shock and vibration immunity is designed in with stiffener bars, wedge locks and conduction cooling.

The CM6 provides a unique feature set, including up to 1 Gbyte of DDR2 SDRAM with ECC, system and non-system mode support for the CPCI backplane, one PMC interface (64-bit/100 MHz). A high level of functional integration (two Gigabit Ethernet, two serial interfaces (RS-232 and RS-422/485), Flash and GPIOs) within a single slot gives users the freedom to use the PMC for their application-specific I/O.

Supported operating systems are Linux®, and VxWorks®. LynxOS® and Integrity are available on request.

The CM6 is designed for RoHS compliance.
Specifications

Processor – PowerPC MPC8641
• Single or dual core PowerPC e600
• 1000 MHz to 1333 MHz
• Integrated L2 cache with optional ECC
• High efficiency on-board switching regulator (DC/DC)
• COP interface at rear I/O
• Fanless cooling with heat sink
  * Contact factory for latest CPU versions

<table>
<thead>
<tr>
<th>Processor</th>
<th>Level 1</th>
<th>Level 2 Cache</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPC8641</td>
<td>32 Kbyte</td>
<td>1 Mbyte</td>
</tr>
<tr>
<td>MPC8641D</td>
<td>32 Kbyte</td>
<td>2x 1 Mbyte</td>
</tr>
</tbody>
</table>

CompactPCI
• PICMG® 2.0 R3.0 compliant PCI 32-bit/66 MHz local bus standard
• System/non-system PCIe-PCI bridge from Pericom for up to 7 slots
• J1+2, 2 mm pin and socket connectors (IEC-1076-4-101)

Chipset – System-on-Chip MPC8641
• Up to 600 MHz internal MPX bus
• DDR2 memory interface up to 667 MHz data rate
• PCI Express
• Ethernet MAC controllers
• Multi processor interrupt controller
• Four channel DMA controller

Memory – DDR2 667
• High-speed up to 667 MHz (PC5400) DDR2 SDRAM
• 64 bit wide with optional ECC
• Up to 1 Gbyte with soldered components

PCI express to PCI
• PCI buses provided through PCIe/PCI bridges Pericom PI7C9110 and PI7C9X130

PMC Extension Slot - IEEE P1386/1386.1
• 64-bit/100 MHz PCI-X
• With front panel I/O and partly rear I/O
• 100 MHz operation with 3.3 V I/O
• 33 MHz operation with 5 V I/O tolerance
• Supports ccPMC Draft Standard VITA 20 – 199x with style 8

Gigabit Ethernet
• MPC8641 integrated Ethernet MAC controller
• Transmit and receive FIFO
• MV88E1118 PHYs with GMII interface
• Two 10/100/1000BaseX with auto-negotiation
• Available at rear

Flash
• Up to 256 Mbyte 32-bit wide Flash for boot and application code
• Software and hardware write protected

nvSRAM and RTC
• Simtek STK17TA8 device
• 128 Kbyte autobase nvSRAM
• Real time clock (no backup)

Serial I/O - RS232/485
• Integrated in MPC8641
• Two async. 16550 compatible full duplex serial channels
• Available on the rear
• High-speed transfer speed up to 115.2 Kbaud with 16 byte FIFOs
• COM1 with RS-232 and COM2 with RS-422/485 driver
• Each interface with RxD, TxD, RTS, CTS

General Purpose Inputs/Outputs
• eights GPIO (input or output) pins with interrupt capability
• Available at rear I/O shared with PMC I/O signals

EEPROM
• 1 Mbit (128 Kbyte) serial EEPROMs for non-volatile user data

Watchdog
• Can drive interrupt or reset
• Configurable granularity from 256 ms to 16 s

Temperature Sensors
• CPU die and heat sink temperature software readable in the range of –55 °C to +127 °C

Front and Onboard I/O

<table>
<thead>
<tr>
<th>Function</th>
<th>On-board I/O</th>
<th>Rear I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet 0</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Gigabit Ethernet 1</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>COM 1 &amp; 2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PMC I/O or GPIO</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Reset</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>COP</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>LED</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Board Fail</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Write Protect</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Config Detect</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Boot Loader
• VxWorks Boot Loader
• Alternatively PMON Boot Loader and functions
Software

- The following software is supported to the extended list below:

<table>
<thead>
<tr>
<th>OS</th>
<th>On Request</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>VxWorks</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Linux</td>
<td>-</td>
<td>√</td>
</tr>
<tr>
<td>Integrity</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>LynxOS</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

Power Requirements

- +5 V, +3.3 V Required
- -12 V, +12 V If required by mounted PMC module

Power Consumption - typical operating current (estimated)

- 512 Mbyte memory bank and without PMC module.

<table>
<thead>
<tr>
<th>MPC8641</th>
<th>5 V</th>
<th>3.3 V</th>
<th>Total Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 GHz LV Dual</td>
<td>3.4 A</td>
<td>4.0 A</td>
<td>26 W</td>
</tr>
<tr>
<td>1.33 GHz Dual</td>
<td>6.4 A</td>
<td>4.0 A</td>
<td>41 W</td>
</tr>
</tbody>
</table>

Operating estimated at VxWorks prompt, no power saving

Power Allowances - PMC slot

- +5 V, +3.3 V: Total power max. 7.5 W
- ±12 V: 100mA each

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Mechanical – PICMG 2.0

- 3U, 1 slot wide, (100 x 160 x 20 mm)

Temperature

- Note: For detailed information about the operating temperature behavior of the board of any style it is absolutely necessary to consult the manual. The processor type and speed, altitude, the use or not use of Ethernet, ambient conditions and the type of cooling influence the board temperature range.
- All values under typical conditions without PMC.
- Range

<table>
<thead>
<tr>
<th>Operating</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>0 °C to +70 °C</td>
</tr>
<tr>
<td>Extended</td>
<td>-40 °C to +85 °C</td>
</tr>
<tr>
<td>Rugged</td>
<td>-40 °C to +85 °C</td>
</tr>
</tbody>
</table>

Humidity

- Operating: 5 - 95 % @ 40 °C
- Storage: 5 - 95 % @ 40 °C
- Non condensing

Altitude

- Operating: 15,000 ft. (4.5 km)
- Storage: 40,000 ft. (12 km)
- Vacuum for conduction cooled board (contact factory)

Shock (3 axis, up & down, 5 hits/direction)

- Styles 1, 3: 12 g / 6 ms
- Style 8: 100 g / 6 ms, 40 g / 11 ms

Vibration (60 minutes each axis)

- Styles 1, 3: 2 g rms @ 5 to 100 Hz
- Style 8: 14 g rms @ 5 to 2000 Hz

VITA 47

- Designed to meet VITA 47 class EAC1, EAC3 and ECC4

MTBF

- Calculations are available in accordance with MIL-HDBK-217 FN2

Safety

- All PCBs are manufactured with flammability rating of 94V-0 by UL recognized manufacturer
- Designed to meet standard UL 60950
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Block Diagram

Ordering Information

Hardware Accessories
CTM19: I/O transition module for 3U backplane (IEEE 1101.11-1998 compliant)
SC-484TB05CM6R: 4U, 19” starter cage with 5 CPCI slots, backplane, power supply

Operating Systems
Extensive operating systems support is available, (see page 3 of this document).
Chassis with power supplies, backplanes and drives on request.
For detailed information and further options, contact GE Fanuc Intelligent Platforms

About GE Fanuc Intelligent Platforms
GE Fanuc Intelligent Platforms is a leading global provider of embedded computing solutions for a wide range of industries and applications. Our comprehensive product offering includes many types of I/O, single board computers, high performance signal processors, fully integrated, rugged systems including flat panel displays, plus high speed networking and communications products. The company is headquartered in the U.S. and has design, manufacturing and support offices throughout the world. Whether you’re looking for one of our standard products or a fully custom solution, GE Fanuc Intelligent Platforms has the breadth, experience and 24/7 support to deliver what you need. For more information, visit www.gefanuc.com.

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Additional Resources
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www.gefanuc.com

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